U.S. State and Local Fiscal Policies and Nonmetropolitan Area Economic Performance: A Spatial Equilibrium Analysis

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Abstract. Faced with declining economic bases, many nonmetropolitan areas increasingly have become concerned about their future economic viability. A crucial dimension of this concern is the balancing of the need to be cost-competitive in terms of lower taxes against the need for provision of valued government services. Using a spatial equilibrium framework, this study econometrically examines the nexus between U.S. state and local fiscal policies and nonmetropolitan county growth in earnings and housing rents during the 1990s. The results suggest that state and local fiscal characteristics were important location determinants. Some characteristics could be clearly identified as having dominant firm profit effects while numerous others were identified as having household amenity effects. In addition, fiscal policies appeared to be more important for economic growth of nonmetropolitan counties which were remote from metropolitan areas than they were for counties adjacent to metropolitan areas.

Keywords: Regional Fiscal Policies; Rural Development; Spatial Equilibrium

JEL: R51; R58; H30

1. Introduction

Dating at least as far back as Tiebout (1956) and Tullock (1971) state and local governments have long been thought to use fiscal policy to promote economic growth. Faced with declining resource-based industries and competition with low-cost producers worldwide, many rural areas in the United States could be especially expected to be interested in using fiscal policy to broaden their economic bases and stimulate growth. Yet, the economic declines experienced in rural areas place stress on governmental services, putting rural governments in the difficult position of balancing the demand for needed services with the desire to be cost-competitive with their tax policies.

In a general review of regional tax studies, Bartik (1991) concludes there is a modest negative relationship between the magnitude of most taxes and metropolitan and state growth. On the other side of the ledger, in his review of the literature Fisher (1997) reported that some government expenditures consistently have positive effects, particularly those on highway transportation, though he found less support for education and safety expenditures. Helms (1985) found that taxes used to finance transfer payments such as welfare expenditures reduced growth, while those used to finance public services such as highways and education did not reduce growth, suggesting that it was important to control for categories of public expenditures in examining the effects of taxes.[1] Dalenberg and Partridge (1995) found greater education expenditures and lower taxes as stimulating metropolitan area employment growth. Brown, Hayes and Taylor (2003) found that while some state and local expenditures more than offset the negative effect of taxes, most did not. Brown and Taylor (2006) found that the net effect of the size of state and local government changed over time, having negative effects on private sector growth in the 1980s, but likely on balance maximizing private sector growth in the 1990s.[2]

[1] In a meta-analysis of the studies examined by Bartik (1991), Goss (1995) concludes that studies which fail to control for public services understate negative tax effects.

[2] Likewise, Deskins and Hill (2010) found evidence that the negative effects of taxes on state economies have diminished from 1985 to 2003, as the variation in the size of state and local government diminished.

Mixed evidence also has been reported for nonmetropolitan areas and for industries of particular interest to rural areas. Henderson and McNamara (2000) found food manufacturing to be sensitive to state and local tax burdens in the Corn Belt region. Goetz (1997) also found such a relationship for food manufacturing establishment growth among all U.S. counties. Yet, for nonmetropolitan counties in the lower 48 U.S. states, Lambert and McNamara (2009) did not find any negative significant relationships between the property tax burden and the location of various types of food manufacturing plants. Among nonmetropolitan Indiana counties, Rainey and McNamara (1999) reported that manufacturing firms tended to avoid counties with relatively high property tax rates. Monchuk et al. (2007) found that increased local tax burdens had a negative impact on income growth in Midwest rural counties, as did state personal and corporate income taxes. Hammond and Thompson (2008) found that human capital investment increased per capita income growth in U.S. nonmetropolitan labor market areas, while public infrastructure investment did not. Huang, Orazem, and Wohlgemuth (2002) found that local government expenditures on public welfare and highways increased rural population growth in the Midwest and South. They further found that the net effect of local government expenditures and taxes is approximately zero, or slightly negative, on rural working-age populations.

Thus, consistent with the conclusion of Wasylenko (1997), the results continue to vary widely across studies, making it difficult to understand the ways and extent state and local fiscal policies influence economic activity. Given the inconclusive evidence and the continued interest in the issue among policy makers, this paper examines the relationship between economic growth in U.S. nonmetropolitan counties and state and local fiscal policies. Using U.S. Census data we examine the effects of state and local fiscal policies on nonmetropolitan county earnings and housing rents during the 1990s.

The analysis rests on the widely used spatial equilibrium approach of Roback (1982) which was adopted for examination of state and local fiscal policies by Gyourko and Tracy (1989; 1991) for U.S. metropolitan areas. A primary advantage of the spatial equilibrium approach over employment or population growth regressions is its ability to determine whether

the tax policies mostly work through affecting firm profitability or household amenity attractiveness of a region (Beeson and Eberts, 1987; 1989). [3] In addition to an overall assessment for nonmetropolitan counties generally, we also examine sub-samples to determine whether state and local fiscal policies matter less for nonmetropolitan counties which are not adjacent to metropolitan areas (Rainey and McNamara, 2002).

The next section presents the basic spatial equilibrium model used in this study. Included is a review of the metropolitan results of Gyourko and Tracy (1989; 1991) to illustrate the spatial equilibrium channels through which fiscal policies can affect earnings and housing rents. In addition to extending the Gyourko and Tracy studies to nonmetropolitan areas, we also expand the framework to consider firm location effects of fiscal policies. Section 3 discusses the empirical implementation of the model. Presentation and discussion of results follow in section 4. We find consistent evidence that the composition of state and local fiscal characteristics significantly influence the location of households and firms. We also find fiscal characteristics to be more important in nonmetropolitan counties which are not adjacent to metropolitan areas than in those which are adjacent. Section 5 contains a brief summary and concluding statements.

2. Theoretical Framework

The theoretical framework follows the spatial general equilibrium approach of Roback (1982) and Beeson and Eberts (1989). In this framework, spatial differentials in wages and land rents are assumed to reflect capitalized equilibrium values of site specific characteristics to firms and households. Among the site characteristics which distinguish the attractiveness of regions for firms and households are the tax and expenditure policies of state and local governments (Gyourko and Tracy, 1989; 1991; Brown, Hayes and Taylor, 2003; Brown and Taylor, 2006).

[3] An alternative approach is to use a structural model. For example, Laurent, Mignolet and Meunier (2009) use a structural model to examine which fiscal instruments could best offset a productivity disadvantage in a lagging region for France.

2.1 Basic Model

The model assumes an economy comprised of two optimizing representative agents: the household and the firm. A representative household earns income from selling one unit of labor and chooses amounts of a composite good (X), residential land (L_h), and site characteristics (s) so as to maximize utility subject to a budget constraint:

$$\max\ U(X, L_h; s) \qquad \text{subject to } w + I = X + rL_h \tag{1}$$

where w and r represent the wage and land rental rates, respectively; I denotes nonlabor income which is assumed to be independent of worker location (s). The above can be solved to obtain the indirect utility function, which is assumed equal across regions in equilibrium because of perfect mobility of households (Roback, 1982):[4]

$$V(w, r; s) = \overline{V} \tag{2}$$

where $V_w > 0$, $V_r < 0$, and with the sign of V_s depending on whether s is an amenity or disamenity.

A representative firm produces the composite good X according to a constant-returns-to-scale production function in terms of labor and land: $X(L_f, N; s)$, where L_f is land used in production and N is the number of units of labor, and s operates as a profitability shifter. The good is traded nationally without frictions and hence has normalized price equal to unity. For a given quantity of X, the firm minimizes costs in choosing the quantities of land and labor. Assuming perfectly mobile firms, costs are equalized across locations and set equal to the normalized price of the traded good:

$$C(w, r; s) = 1, \tag{3}$$

where $C_w > 0$, $C_r > 0$, while the sign of C_s depends on how s affects production costs.

Assuming that the values of all characteristics are capitalized into wages and land rents in spatial equilibrium, the effects of site characteristics on wages and rents can be obtained by differentiating Equations (2) and (3) and solving for *dw/ds* and *dr/ds* (Roback, 1982; Beeson and

[4] Evidence of high U.S. labor mobility pre-2000 can be found in Blanchard and Katz (1992) and Partridge et al. (2011).

Eberts, 1989).[5] In equilibrium, site characteristics which are considered attractive (positive amenities) by households increase land rents and decrease wages. Characteristics valued by firms increase both land rents and wages. Thus, characteristics valued by both firms and households unambiguously raise land rents, while the wage effect depends on whether the firm or household effect dominates. Thus, in reduced form, wages and rents both are a function of the site-specific characteristics.

As shown in Table 1, the combined pattern in wages and rents can be used to determine whether the dominant effect of a location characteristic on the economy is related to firm profitability or household amenities (Beeson and Eberts, 1987). A characteristic which raises both wages and rents is interpreted primarily as profit enhancing. This can be seen in Table 1, for example, where an attribute is profitable but does not have any household amenity value. Even if the characteristic also makes an area more amenity-attractive, the net positive effect on wages indicates that the profitability effect dominates the amenity effect. Contrarily, a characteristic which reduces profitability reduces both wages and rents. If a characteristic increases land rents but lowers wages we know there is a dominant amenity effect — shown in Table 1 as a characteristic which is amenity attractive but does not have any profitability effect. A characteristic raising wages but lowering rents is interpreted as having a dominant negative amenity effect. Whether a characteristic is household amenity attractive whatsoever is revealed by the effect on the real wage. For example, higher housing rents and an absence of a nominal wage effect indicates a positive household amenity effect. Similarly, a rise in wages but an absence of a rent effect indicates a negative household amenity effect.

2.2 Spatial Equilibrium Fiscal Effects

Gyourko and Tracy (1989; 1991) recognized that state and local government taxes and expenditures were among the characteristics which affected firm profitability and household

[5] Spatial equilibrium only requires that factor prices be fully flexible, though perfect labor mobility is required for the factor prices to fully reflect the values of site specific characteristics (Bayer, Keohane and Timmins, 2009).

amenity attractiveness of an area and hence wages and housing rents. Less congestion on the roadways, for example, can reduce transportation costs for firms and increase household utility. Taxes and government services though may differentially affect households versus firms. We review their findings below to illustrate fiscal policy channels of influence within the spatial equilibrium framework.

In a reduced-form examination of wages across U.S. cities Gyourko and Tracy (1989) reported that state and local fiscal conditions explained almost as much of the variation in wages as did worker characteristics. The seven fiscal variables included three tax variables and four government services variables. As a group, the seven variables were significant across various model specifications.

Higher local and state income tax rates were associated with higher gross wages, suggesting that workers needed to be compensated for higher taxes. Thus, local and state income taxes could be thought of as reducing the household amenity attractiveness of the city. Higher state corporate income taxes reduced wage rates, suggesting that corporate income taxes could not be shifted forward onto consumers or backwards onto capital owners. This fits the model above which contains a frictionless tradable good and perfectly mobile capital, in which higher corporate income taxes reduce firm profitability, reducing labor demand and nominal wages. Violent crime was positively associated with wages, suggesting it was a household disamenity. Likewise, lower fire protection acted as a household disamenity, raising wages. An education variable was insignificant.

Although the above wage results are broadly consistent with fiscal policies affecting regional household amenity attractiveness, this can only be convincingly established by examining both the wage and housing price effects of fiscal policy differentials and calculating hedonic prices. Thus, Gyourko and Tracy (1991) examined the variation of both wages and housing prices across U.S. cities. In calculating hedonic prices for fiscal policy attributes, Gyourko and Tracy (1991) found that fiscal policy differentials were nearly as important as natural amenity differentials in determining the quality of life across cities. The fiscal

characteristics examined included combined state and local income taxes, state corporate income taxes, property taxes, and measures of police, fire, health, and education services.

The fiscal characteristics having the greatest household amenity value were police and health services. However, the values were primarily reflected in lower wages as payments for lower violent crime and more hospital beds, being insignificant in the housing price equation. Fire protection also had a slightly positive household amenity effect. With both housing prices and wages estimated to be significantly lower with greater fire protection, counter to expectations, the results also suggested a dominant negative profitability effect — an interpretation not considered by the authors.[6] Lower wages also were significantly associated with better police protection. Education services were insignificant and had the wrong sign.

In terms of taxes, state and local income taxes exerted a negative household amenity effect through a negative housing price effect and an absence of a significant effect on wages. Thus, instead of higher gross wages as found in Gyourko and Tracy (1989), the negative amenity effect of income taxes was found to be capitalized into lower housing values. Higher property taxes significantly reduced housing values, and by assumption of the theoretical model, had no effect on wages; thus property taxes were interpreted as a household disamenity. Higher corporate income taxes were surprisingly found to be a positive amenity as they were associated with significantly lower wages and higher housing prices. Given the unlikelihood that corporate income taxes were shifted to nonresidents (consistent with the model above), the authors suggest the variable may have been capturing unaccounted for agglomeration effects which were passed on to residents in the form of higher housing prices.

2.3 Reduced-Form Equations

The framework above then indicates that wages and rents can be written as reduced-form outcomes of the site specific characteristics, among which include state and local fiscal policies:

$$w = f(FISCAL, z) \quad (4)$$

$$r = g(FISCAL, z), \quad (5)$$

[6] Gyourko and Tracy (1991) did not consider potential profitability explanations for any of their results.

where FISCAL denotes a vector of state and local fiscal policies, and z denotes other site specific characteristics such as the natural amenity attractiveness of the area. The fundamental assumption is that the site characteristics are capitalized into wages and rents in equilibrium. The pattern of relationships between the factor prices and the fiscal characteristics across space reveal whether there are *dominant* household amenity or firm profitability effects, and also whether there are significant household amenity effects which are not dominant.

3. Empirical Implementation

Corresponding to equations (4) and (5), reduced form econometric equations are specified for both earnings and housing costs in U.S. nonmetropolitan counties (excluding counties in Alaska and Hawaii). Nonmetropolitan counties simply are those not included in metropolitan areas by the U.S. Census Bureau in 2000.[7] The full sample consists of 1,998 counties, which we also separate into two sub-samples according to the rural-urban continuum codes developed by the Economic Research Service of the U.S. Department of Agriculture. The first sub-sample contains 1,040 nonmetropolitan counties which are adjacent to a metropolitan area. The second sub-sample contains 958 nonmetropolitan counties which are not adjacent to a metropolitan area. A list of the variables and descriptive statistics for the full sample are provided in Table 2.

The change in the natural log of earnings for employed residents ($\dot{EARN}$) and the change of the natural log of housing costs ($\dot{HCOST}$) over the period 1990 to 2000 are the two primary dependent variables.[8] Although our theory indicates that land rents should be examined, housing costs should be a good proxy for land rents because spatial differences in quality-adjusted residential housing prices primarily result from differences in the embedded land values (Davis and Palumbo, 2008).

[7] We follow the U.S. Bureau of Economic Analysis in merging independent cities with the surrounding county to form a more functional economic area (mostly in Virginia).

[8] Total earnings have advantages over other possible measures of income in the hedonic framework. For example, per-capita income does not conform to the labor earnings construct in the hedonic model because it includes capital income. The average wage per job in the county could be unrepresentative of labor earnings, especially in rural areas with seasonal and part-time work; the mean wage measure would classify a person working one full-time job and two infrequent part-time jobs as having three separate jobs, which would likely result in a relatively low average wage for each job (Partridge et al., 2009).

The variable HCOST is constructed as the log of weighted average median gross rent ($ per month) of owner and renter-occupied housing units for 2000 (Gabriel, Mattey and Wascher, 2003). For owner-occupied units, median housing prices are converted into imputed annual rent using a discount rate of 7.85% (Peiser and Smith, 1985).[9] The monthly average of this amount along with the median monthly rent for the renter-occupied units, weighted by the shares of owner- and renter-occupied houses, is our median housing cost variable.

Hence, in the full sample and the two sub-samples, for county *i*, located in state *s*, we specify the econometric hedonic equations as:

$$\dot{EARN}_{is} = \beta_0^W + \beta_1^W \dot{SFISCAL}_{is} + \beta_2^W \dot{CFISCAL}_{is} + \beta_3^W REG_{is} + \beta_4^W AMENITY_{is} + \beta_5^W \dot{DEMOG}_{is} + \varepsilon_{is}^W \quad (6)$$

$$\dot{HCOST}_{is} = \beta_0^R + \beta_1^R \dot{SFISCAL}_{is} + \beta_2^R \dot{CFISCAL}_{is} + \beta_3^R REG_{is} + \beta_4^R AMENITY_{is} + \beta_5^R \dot{STRUC}_{is} + \varepsilon_{is}^R \ldots \quad (7)$$

The difference equations reflect an economy transitioning from one static equilibrium to another in response to a change in one or more site characteristics (Dumais, Ellison and Glaeser, 2002; Partridge and Rickman, 2010). Econometrically, a difference equation provides certain advantages over an equation in levels. For one, there are circumstances where there are consistent unobservable influences that bias the levels-based estimates. In differences we implicitly control for county level fixed effects. The difference equation has an additional advantage as it often reduces the severity of multicollinearity.

SFISCAL is a vector of state fiscal attributes which includes five categories of state level tax revenues and seven categories of state level expenditure variables. For the state fiscal variables, we calculate effective tax rates by dividing state and local government tax revenues from individual income, sales, property, corporate income and other taxes by state personal income. The categories of government services also are divided by state personal income and include expenditures on highways, education (elementary and secondary), public safety (police protection, fire protection, and corrections), public health and hospitals, environment (natural resources, parks and recreation), housing (housing and community development, sewerage, and

[9] Partridge et al. (2010) and Rickman and Rickman (forthcoming) find that the choice of discount rate does not affect county level housing cost regressions because the discount rate is applied uniformly across counties.

solid waste management), and government administration (financial administration, judicial and legal). CFISCAL is a vector of county fiscal variables all divided by county personal income, including county property and sales taxes. These fiscal variables are obtained from the U.S. Census Bureau's Census of Government (COG). Hence, the vector $\dot{SFISCAL}$ ($\dot{CFISCAL}$) is defined as the value of SFISCAL (CFISCAL) in 2002 minus the same for1992.[10]

The **REG** vector includes several categories of dummy variables: Census division dummies (Pacific is the omitted division) used to capture growth differences common to a census division; and U.S. Department of Agriculture Economic Research Service (ERS) dummy variables indicating whether a county historically is farming dependent, mining dependent, has 30% of its lands as federally-owned, or is a recreational county. Also included in the **REG** vector are ERS rural-urban continuum dummy variables and a dummy variable reflecting whether the county is located in a state possessing a right-to-work law. Thus, in addition to controlling for county levels fixed effects through differencing, inclusion of these dummy variables controls for common unobserved influences on growth.

Further, we introduce a vector of natural amenity attributes (**AMENITY**) that may affect changes in earnings and housing costs. Natural amenity variables include the following measures: the average temperature for January and July, respectively, the average number of days with sunshine in January and the average humidity for July, the percentage of county area that is covered by water; the topography score index. These amenity variables also are taken from ERS (McGranahan, 1999). Although these variables are fixed over time, changing demands for amenities can lead to persistent regional growth differences (Graves, 1980).

We control for the influence of population characteristics on earnings by including demographic variables ($\dot{DEMOG}$) in equation (6). The **DEMOG** vector includes six age and five racial composition variables, four education variables, the percentage of population that are

[10] The omitted fiscal variables are intergovernmental revenues, non-general revenues, non-general expenditures (i.e., liquor store, utility, or insurance trust expenditures), and welfare expenditures. Thus, the coefficient for each fiscal variable should be interpreted as the effect of increasing that expenditure or tax while reducing the average of the omitted categories.

female, married, and had a linguistic isolation problem, respectively. Also we control for housing characteristics by including several housing quality related variables ($\dot{STRUC}$) in equation (7). The **STRUC** vector contains the median number of rooms in the structure, the age of housing units, the shares of 1-5 bedrooms out of total rooms, the share of housing units that are mobile homes, and the shares with complete plumbing and kitchen. The median number of rooms indicates the size of the housing unit. The age differences in the housing units reflect the differences in construction technology, type and efficiency of mechanical systems (for example, heating and wiring) and the time over which the structure has been subject to normal wear and tear (Galster, 1987).

One of our empirical concerns is that county labor and housing markets could influence the local fiscal variables, indicating reverse causality. For example, the greater are home values in a county the lower are the tax rates needed to generate revenues to finance governmental programs. Alternatively, a struggling region may be more prone to cut taxes or spend money on categories believed to be productive such as on highways. If this is the case, OLS estimates of Equations (6)-(7) would be biased and inconsistent. Likewise, there may be common shocks underlying the state fiscal variables and county earnings and housing prices, inducing statistical endogeneity.

To overcome the potential endogeneity of the fiscal variables, instrumental variable (IV) estimation is implemented. Instruments are needed which affect the outcome variables only through the mechanism of the fiscal variables but are exogenous. Thus, we require variables that are strongly correlated with $\dot{SFISCAL}$ and $\dot{CFISCAL}$ but uncorrelated with the error term.

Because of the difficulty in finding such instruments we use beginning-of-period (1992) levels of the fiscal variables as instruments for the subsequent differences. In addition, recognizing that the political system could affect the outcome of local fiscal policies, we also include two voting behavior variables as instruments. For instance, Republican governments may tend to favor low taxes and low spending while Democratic governments may tend to have higher levels of expenditures being financed by higher taxes. So, we consider as our first set of

instruments the fiscal variables in 1992 values plus two additional political voting behavior instruments. We use the percentage of votes cast for the Republican candidate in the 1972 presidential election (**PRES_REP72**) and the percentage of presidential election turnout in 1972 (**PRES_TO72**), using deep lags to mitigate endogeneity.

There are several tests of the IV regressions that we perform. First, to diagnose the possible endogeneity of $\dot{SFISCAL}$ and $\dot{CFISCAL}$, the Durbin-Wu-Hausman test is employed. Second, we employ the Anderson canonical correlations likelihood ratio test to check the relevance of the excluded instruments. A rejection of the null hypothesis indicates that the model is identified and that the instruments are relevant. Third, we conduct the Anderson-Rubin likelihood ratio test to check whether the endogenous variables are jointly statistically significant. Lastly, we check the identification conditions for our instruments; i.e., we test whether the over identification restrictions hold (Sargan, 1958).

Further, we conduct sensitivity analysis to assess the robustness of our results. First, we exclude the demographic variables in the earnings equation and housing structure variables in the housing cost equation because as aggregate measures the $\dot{DEMOG}$ variable and $\dot{STRUC}$ variables may be endogenous (Partridge et al., 2010, Rickman and Rickman, forthcoming). Second, in sensitivity analysis we omit the state level variables (state fiscal variables, census dummy variables, right-to-work dummy variable; ERS dummy variables) and replace them with state fixed effects variables in the IV estimation to control for all possible state level growth differences.

We estimate standard OLS and IV models in our base case analysis and not spatial econometric models. We do this because spatial autocorrelation tests have difficulty determining whether spatial heterogeneity underlies the presence of spatial autocorrelation because of data pooling or whether it is of the nuisance variety arising from arbitrary boundaries of the units of analysis (McMillen 2003). We pool the data to obtain an average national effect and for increased efficiency of the estimates. Corrections for spatial autocorrelation also involve specification of an arbitrary weight matrix, for which there is no guarantee it is suitable to the

spatial process at hand and it is unlikely that the spatial dependence can be accurately captured by a single parameter on the weight matrix (Pinske and Slade, 2010). This especially applies in our setting where there are missing spatial observations because of the omission of metropolitan counties from the full sample, and particularly for the sub-samples of nonmetropolitan counties based on adjacency/non-adjacency to metropolitan areas.[11] Spatial lag analysis likely suffers from the reflections problem, making causal identification problematic (Pinske and Slade, 2010); thus, spatial lag analysis is better suited for descriptively examining correlations among members or for predictive purposes as are time lags in time series forecasting. Nevertheless, in sensitivity analysis, we include weighted fiscal policy variables for neighboring counties and allow for spatial clustering in errors to produce robust estimated standard errors.[12]

4. Results

Table 3 contains the results from estimation of the housing rent growth regression (Equation (7)) for the full sample, while Table 4 contains the corresponding results for earnings growth (Equation (6)). The sole difference in specification of independent variables is the use of population characteristic variables in the earnings equation and the use of housing characteristic variables in the housing rent equation. In each table, the first column displays the results from ordinary least squares (OLS) estimation. The second column displays the instrumental variable (IV) estimation results using beginning-period levels of the fiscal variables and political voting variables as the identifying instruments. IV estimates obtained after dropping the housing/population characteristic variables appear in the third column. The final column of results reflects the inclusion of state fixed effects to the IV column (2) model, while dropping all county-invariant variables.

[11] In a spatial hedonic application, Mueller and Loomis (2008) found that the potential inefficiency of OLS in the presence of spatially correlated errors was not economically significant, suggesting that nonspatial estimation was adequate. This may particularly be true in our setting because of the factors discussed above which make it problematic that efficiency can be improved with spatial estimation and may even be reduced.

[12] All regressions were run in STATA 10.

From the first columns of results in Tables 3 and 4, the negative and significant effects for state individual income taxes and the category of other state taxes for both housing rents and earnings suggest dominant adverse firm profit effects. While personal income taxes could be expected to raise the earnings of the employed to reflect household disutility, the negative firm effect dominated to produce a net negative effect. This may particularly occur as owners of small establishments pay personal income taxes and CEOs of larger companies may be influenced by their personal income taxes in deciding where to locate their companies. The positive and significant signs for state public safety expenditures in both equations suggest dominant positive firm effects. Increased corporate incomes taxes are associated with significantly lower growth in housing rents as are increased expenditures on government administration. State expenditures on healthcare, and environment and housing, increased housing rent growth, which when combined with insignificant earnings effects suggest household amenity attractiveness. Sales taxes have unexpected positive signs in both equations. Sales taxes might be expected to increase earnings as a disamenity but then housing rent growth also should be lower. The county fiscal variables are generally insignificant, except for the significant negative sales tax effect on earnings growth.

More importantly, the IV estimates in the second column of Table 3 reveal significant negative effects on housing rent growth from increased state property taxes, state individual income taxes, and other state taxes. Combined with insignificant earnings effects (Table 4), this suggests the taxes act as household disamenities. Increased state expenditures on highways, and environment and housing are found to increase housing price growth, but have insignificant effects on earnings, suggesting positive household amenity effects. Contrarily, negative housing rent effects are found for increased expenditures on state education, health care and government administration. State sales taxes and corporate income taxes are positively related to earnings, though they are insignificant for housing rents, suggesting household disamenity effects. The positive value for corporate income taxes is a surprise theoretically but empirically is consistent with the findings of Gyourko and Tracy (1991). Significant positive effects on both housing rents and earnings for county primary and secondary education suggest dominant firm profitability

effects. Highway expenditures are negatively related to earnings and insignificantly related to housing rents, suggesting household amenity attractiveness.

The instrument tests at the bottom of column (2) in Tables 3 and 4 suggest that the state and county fiscal variables are statistically endogenous. Based on the Anderson canonical correlation likelihood ratio tests the excluded instruments are relevant in both IV regressions and the models are identified. The Anderson-Rubin likelihood ratio tests also indicate that the endogenous variables are jointly significant in each equation. However, we reject that the over identification restrictions hold in each regression.

As shown in column (3) of Tables 3 and 4, dropping the housing characteristic variables from Equation (6) and the demographic variables from Equation (7) hardly affects the IV results. A few variables slightly lose statistical significance in the two equations, while a few slightly gain statistical significance. This suggests that coefficient bias from potential endogeneity of the housing and population characteristics is not a major concern.

The final columns of results in both tables reflect the addition of state fixed effects and the omission of all county-invariant variables (using the column 2 base model). State fixed effects control for unmeasured state level influences on growth in housing rents and earnings. The advantage of including state growth fixed effects is the reduction in possible omitted variable bias in estimating the county fiscal policy effects. The disadvantage is the loss of information on state level fiscal policy effects.

The Durbin-Wu-Hausman test suggests that the county fiscal variables are endogenous. The tests also indicate that the models are identified and the endogenous variables are significant. In contrast to the other IV models containing state fiscal variables, the over identification restrictions hold in each equation at the five percent level.

Consistent with expectations of property taxes being capitalized into land prices (Brown, Hayes and Taylor, 2003), county property taxes significantly and negatively influence housing rents but have no significant effect on earnings, suggesting a household disamenity effect. County sales taxes are insignificant in both equations. However, county expenditures on both

primary and secondary education and public safety have positive firm profitability effects. This suggests that counties need to worry more about their provision of public safety and education services to remain economically competitive in attracting firms than on lower sales taxes. In fact, the positive effect of public safety on housing rents exceeds the negative effect of property taxes. Highway expenditures have only a significant negative effect on earnings, and a positive insignificant effect on housing rents, suggesting a positive household amenity effect — but not one that is dominant statistically.

We next examine whether nonmetropolitan counties which are adjacent to metropolitan areas respond differently to fiscal policy changes than those which are not adjacent (Rainey and McNamara, 2002), though we continue to include dummy variables for the ERS rural-urban continuum county categories which pertain to the specific sub-sample. The results for the two sub-samples for both earnings and housing rents for the base IV model (column 2 model in Tables 3 and 4) are shown in Table 5.

The base model instrumental variable evidence suggests fewer fiscal policy effects in nonmetropolitan counties adjacent to metropolitan areas relative to counties not adjacent to metropolitan areas. For metro-adjacent counties, only other state taxes have dominant negative firm effects. Corporate income taxes again have the unexpected positive earnings effect (i.e., a household disamenity effect). Negative expenditure effects on housing rents occur for state primary and secondary education and government administration, while positive effects on housing occur for expenditures on environment and housing. No significant county fiscal policy effects are found.

Contrarily, for nonadjacent counties increased state property, individual income, and other taxes lower growth in housing rents, as do increased county sales taxes, in which combined with an absence of significant earnings effects suggests they are household disamenities. Increased state expenditures on highways and public safety increase housing rent growth, suggesting household amenity attractiveness, while expenditures on hospitals and health decrease growth. Both county expenditures on primary and secondary education (through increasing housing

rents) and highways (through lowering earnings) are revealed as positive household amenities. The near significance of the earnings effect of county education expenditures suggests a strong profitability role as well.

In final sensitivity analysis, Table 6 shows the results of adding variables reflecting neighboring county fiscal variables and adjusting the standard errors for potential clustering of the residuals. Neighboring counties are defined according to Bureau of Economic Analysis labor market regions, which are defined as groups of counties with tight commuting links. Each county's fiscal variable is weighted by its share of population in the region minus the county under study.[13] Results for both the IV base model and IV state fixed effects models are presented in Table 6.

The instrument tests at the bottom of column (2) in Table 6 suggest that the state and county fiscal variables are statistically endogenous (at the eight percent level in column (2)). Based on the Anderson canonical correlation likelihood ratio tests the excluded instruments are relevant in both IV regressions and the models are identified (only at the 12 percent level in column (4)). The Anderson-Rubin likelihood ratio tests also indicate that the endogenous variables are jointly significant in each equation. Each equation passes the over identification restrictions test at the five percent level.

The base model IV results suggest that the category of other state taxes acted as a household disamenity. State expenditures on highways and on the category of environment and housing acted as a household amenity. The county level results confirm the results in Tables 3 and 4 for the IV base model and the IV state fixed effects model. The IV state fixed effects results suggest that county property taxes acted as a household disamenity. County level primary and secondary education expenditures statistically enhanced county productivity according to the base model IV results and nearly so according to the IV state fixed effects results. These productivity effects dominated any possible amenity effects, to increase both earnings and

[13] The Cluster Command in STATA is used for estimation. Comparable results are not reported for the adjacent and non-adjacent counties separately because labor market regions contain both types of counties, which make estimating clustering of the residuals problematic if they are not all included in the same sample during estimation.

housing costs. Dominant productivity effects for public safety also are evidenced in the IV state fixed effects results.

Regarding the neighboring county fiscal variables, neighboring county expenditures on primary and secondary education statistically reduce county productivity according to the IV base model. Similar negative effects are found in the IV state fixed effects model, though the effects are less precisely estimated. Thus, greater education expenditures in nearby counties appear to draw firms away from the county, creating backwash effects. Higher sales taxes in nearby counties produce negative productivity effects, possibly through reduced demand (spread) effects. Higher neighboring county property taxes act as a household amenity, suggesting that within labor market areas households avoid counties with higher property taxes.

5. Summary and Conclusion

Using a spatial equilibrium framework this study econometrically examined nonmetropolitan county growth in earnings and housing rents for the 1990s. Consistent evidence was found to suggest that state and local fiscal characteristics were important firm and household location determinants. Contributions of the study include the application of the approach to the study of nonmetropolitan areas and consideration of both household and firm effects. Some characteristics could be clearly identified as having dominant firm profit effects while numerous others could be identified as having household amenity effects.

Focusing on the primary instrumental variable evidence for the full sample, state individual income, property, and other, taxes significantly discouraged growth through negative effects on household amenity attractiveness. In terms of state government expenditures, those on highways, and the environment and housing, could be identified as household amenity attractive. Yet, consistent with the review findings of Fisher (1997) negative household amenity effects were found for state education expenditures, as well as for expenditures on governmental administration. The education findings may be attributable to the spatial pattern of education spending in the state, rather than negative effects of spending in the county. The surprising finding of positive earnings effects of corporate income taxes fits a similar finding by Gyourko

and Tracy (1991) for metropolitan areas, though is inconsistent with the negative relationship often found in the literature (Felix, 2009).

Nevertheless, consistent dominant positive effects on firm profitability were found for county expenditures on primary and secondary education. Some evidence also was provided suggesting dominant firm profit effects from county spending on public safety. Consistent evidence also was found for positive household amenity effects from county highway spending. There was evidence of negative household amenity effects from increased county property taxes. The positive effects of expenditures sometimes exceeded the negative property tax effects, producing a net positive effect. We also found that fiscal characteristics were more important in nonmetropolitan counties which are not adjacent to metropolitan areas than in those which are adjacent. Most state and county taxes have negative household amenity effects in nonadjacent counties, while county expenditures on education and state expenditures on public safety were household amenity attractive.

Overall, the results suggest that policy makers should be concerned with being cost-competitive with certain taxes, though they also should be careful to be competitive in providing local education and other valued government services. Future research should more fully explore the contexts in which various mixes of fiscal policies promote economic growth. In addition, after the release of Census 2010 summary file data it can be determined whether the importance of state and local policies changed during an increasingly globalized economic environment and national stagnation of employment growth.

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Table 1. Fiscal Impacts on Equilibrium Wage and Rent

	Profitable ($C_s < 0$)	Profit Reducing ($C_s > 0$)	No Profit Effect ($C_s = 0$)
Amenity ($V_s > 0$)	Wage +/- ; Rent +	Wage - ; Rent +/-	Wage -; Rent +
Disamenity ($V_s < 0$)	Wage + ; Rent +/-	Wage + /- ; Rent -	Wage + ; Rent -
No Amenity Value ($V_s = 0$)	Wage + ; Rent +	Wage - ; Rent -	Wage 0; Rent 0

Table 2. Variable Definitions and Descriptive Statistics

Variable	Description	Source	Mean	Std. Dev.
Dependent Variables				
ln(earning2000)	Log of annual earnings (in dollars) in 1999 for the employed over 16	2000 Census	9.819	0.142
ln(earning1990)	Log of annual earnings (in dollars) in 1989 for the employed over 16	1990 Census	9.647	0.188
ln(housing2000)	Log of weighted average median gross house rent ($/month) of owner and renter occupied housing units in 2000 using shares of owner and renter occupied houses.	2000 Census	6.156	0.316
ln(housing1990)	Log of weighted average median gross house rent ($/month) of owner and renter occupied housing units in 1990 using shares of owner and renter occupied houses.	1990 Census	5.731	0.302
County Fiscal Variables (differences in shares of personal income 2002-1992)				
Ctyproperty	Revenue from property tax	1992/2002 COG	0.001	0.016
Ctysales	Revenue from sales tax	1992/2002 COG	0.001	0.003
Ctyhighway	Expend. on highway - charges on highway	1992/2002 COG	0.000	0.007
Ctysafety	Expend. on public safety (police + fire protection)	1992/2002 COG	0.001	0.004
Ctynaturalrec	Expend. on natural resource and parks recreation - corresponding charges	1992/2002 COG	0.001	0.005
Ctysewerage	Expend. on sewerage and waste management - corresponding charges	1992/2002 COG	0.000	0.004
Ctyeducation	Expend. on first and secondary education	1992/2002 COG	0.009	0.019
State Fiscal Variables (differences in shares of personal income 2002-1992)				
Stl_property	Revenue from property tax	1992/2002 COG	-0.001	0.004
Stl_sales	Revenue from sales tax	1992/2002 COG	0.001	0.003
Stl_rest	Revenue from selective, license, and other taxes	1992/2002 COG	-0.001	0.003
Stl_individual	Revenue from individual income tax	1992/2002 COG	0.002	0.003
Stl_corporate	Revenue from corporate income tax	1992/2002 COG	-0.001	0.001
Stl_firstsecond	Expend. on elementary & secondary education	1992/2002 COG	0.003	0.004
Stl_hospitalhealth	Expend. on hospitals - corresponding charges	1992/2002 COG	0.000	0.002
Stl_highway	Expend. on highway - corresponding charges	1992/2002 COG	0.001	0.002
Stl_publicsafety	Expend. on public safety (police, fire, correction, etc) - corresponding charges	1992/2002 COG	0.002	0.001
Stl_environhousing	Expend. on natural resources, parks recreation., housing and community development, sewerage, solid waste management - corresponding charges	1992/2002 COG	0.000	0.002
Stl_govtadmin	Expend. on government administration (Financial administration + Judicial and legal + General public buildings + Other_governmental administration)	1992/2002 COG	0.001	0.001
Demographic Variables (differences 2000-1990)				
Married	Percent population(15 years over) that are married	1990/2000 Census	0.119	0.029
Female	Percent population that are female	1990/2000 Census	-0.006	0.015
Disability	Percent Civilian non-institutionalized population 16 to 64 years with a work disability	1990/2000 Census	0.026	0.030
Lingisolation	Percent households with linguistic isolation prob.	1990/2000 Census	0.002	0.014
African	Percent population African-American	1990/2000 Census	0.001	0.014
Native	Percent population that are Native American	1990/2000 Census	0.001	0.009
Asianpacific	Percent population Asian and Pacific islands origin	1990/2000 Census	0.001	0.003
Other	Percent population with other race background	1990/2000 Census	0.007	0.027

Hispanic	Percent population Hispanic	1990/2000 Census	0.016	0.028
Highschool	Percent population 25 years and over that are high school graduates	1990/2000 Census	0.133	0.036
Somecollege	Percent population 25 years and over that have some college degree	1990/2000 Census	0.100	0.025
Associate	Percent population 25 years and over that have an associate degree	1990/2000 Census	0.022	0.012
Bachelor	Percent population 25 years and over that are 4-year college graduates	1990/2000 Census	0.046	0.021
Age7_17	Percent population 7-17 years	1990/2000 Census	-0.005	0.015
Age18_24	Percent population 18-24 years	1990/2000 Census	-0.001	0.014
Age25_54	Percent population 25-54 years	1990/2000 Census	0.015	0.017
Age55_59	Percent population 55-59 years	1990/2000 Census	0.006	0.008
Age60_64	Percent population 60-64 years	1990/2000 Census	-0.002	0.008
Age65up	Percent population over 65 years	1990/2000 Census	-0.002	0.016
Housing Characteristics (differenced 2000-1990)				
House age	Age of housing unit in (years)	1990/2000 Census	5.812	3.244
Share1bed	Share of 1 bedroom house to total rooms	1990/2000 Census	0.003	0.018
Share2bed	Share of 2 bedroom house to total rooms	1990/2000 Census	-0.020	0.029
Share3bed	Share of 3 bedroom house to total rooms	1990/2000 Census	0.008	0.030
Share4bed	Share of 4 bedroom house to total rooms	1990/2000 Census	0.006	0.019
Share5bed	Share of 5 bedroom house to total rooms	1990/2000 Census	0.001	0.010
Sharemobile	Share of mobile units to all housing units	1990/2000 Census	0.014	0.036
Shareplumb	Share with complete plumbing facility	1990/2000 Census	0.002	0.023
Sharekitchen	Share with complete kitchen facility	1990/2000 Census	-0.003	0.022
Amenity Variables				
TempJan	Mean temperature for January, 1941-71	ERS, USDA	31.476	12.279
SunJan	Mean days of sunshine for January, 1941-71	ERS, USDA	153.103	33.639
TempJul	Mean temperature for July, 1941-70	ERS, USDA	75.560	5.623
HumidJul	Mean relative humidity for July, 1941-71	ERS, USDA	54.184	14.873
Topography	Topography score ranging from 1-21, where 1 represents flat plain and 21represents most mountainous land	ERS, USDA	9.109	6.634
Waterpct	Percent of county area covered by water	ERS, USDA	3.466	9.757
Other Dummy Variables				
Census_division	Census Division Dummy Variables 1-9	ERS, USDA	5.237	1.886
RTW2	Right to work law dummy variable	NRTW	0.560	0.497

Notes: BEA=Bureau of Economic Analysis, REIS. SBEC=Small Business & Entrepreneurship Council. COG=Census of Government. ERS, USDA=Economic Research Services, U.S. Department of Agriculture. HUD=U.S. Department of Housing and Urban Development. NRTW=National Right To Work Foundation. Total Nonmetropolitan Counties=1998.

Table 3. Dependent Variable: log(median house rent 2000)-log(median house rent 1990) for full sample of nonmetropolitan U.S. counties

	OLS	IV	IV-w/out house characteristics	IV-state fixed effects
Intercept	0.71*	0.66*	0.71*	0.848**
	(7.20)	(5.00)	(5.89)	(7.60)
State fiscal variables				
Property tax	2.49**	-7.44***	-5.92	N
	(2.42)	(1.86)	(1.63)	
Sales tax	4.23*	8.23	6.36	N
	(2.78)	(1.34)	(1.11)	
Individual income tax	-6.24*	-22.86***	-15.69	N
	(5.39)	(1.71)	(1.56)	
Corporate income tax	-27.12*	-1.52	0.998	N
	(6.50)	(0.08)	(0.06)	
Other taxes	-7.55*	-25.66*	-27.02*	N
	(5.01)	(4.25)	(4.99)	
Primary and secondary education	0.67	-6.86***	-9.94*	N
	(0.63)	(1.68)	(2.83)	
Hospitals & health	3.39***	-53.085**	-38.91**	N
	(1.72)	(2.16)	(2.25)	
Highway expenditure	-0.95	27.98*	30.18*	N
	(0.65)	(5.08)	(6.07)	
Public safety	8.47**	33.46	19.04	N
	(2.47)	(1.56)	(1.16)	
Environment and housing	9.55*	22.44*	16.85**	N
	(5.25)	(2.91)	(2.49)	
Governmental administration	-17.06*	-30.90**	-14.01	N
	(5.71)	(2.05)	(1.13)	
County fiscal variables				
Property tax	0.34	2.35	2.64	-5.65*
	(1.13)	(0.68)	(0.94)	(2.73)
Sales tax	-0.42	-9.12	-2.65	-0.027
	(0.30)	(0.96)	(0.38)	(0.01)
Primary and secondary education	-0.13	3.85***	3.26***	2.66**
	(0.56)	(1.75)	(1.77)	(2.45)
Highway expenditure	-0.14	-0.38	-0.77	0.16
	(0.24)	(0.25)	(0.59)	(0.17)
Public safety	-0.072	-1.54	-1.69	8.65*
	(0.07)	(0.34)	(0.45)	(3.00)
Natural recreation	-0.18	-2.94	-3.43***	-1.40
	(0.37)	(1.47)	(1.91)	(0.95)
Sewerage and waste mgt	0.32	0.012	-0.27	-1.29
	(0.50)	(0.01)	(0.17)	(1.12)
Housing Structure Variables	Y	Y	N	Y
R-squared	0.53	NA	NA	NA
No. of counties	1998	1996	1996	1996
DWH test for endogeneity	NA	213.63[0.00]	218.93 [0.00]	37.44[0.00]
Sargan overid test	NA	31.19[0.00]	47.45 [0.00]	1.58 [0.45]
Anderson canonical correlation	NA	7.32 [0.06]	12.56 [0.01]	23.66 [0.00]
Anderson-Rubin test	NA	372.23[0.00]	386.88[0.00]	23.80 [0.00]

Notes: Robust *t* statistics based on Huber-White standard errors are in parentheses. *, **, and *** indicate significance at the 1%, 5%, and 10% level. NA denotes not applicable. *p*-values reported in brackets for IV tests.

Table 4. Dependent Variable: log(earnings 2000)-log(earnings 1990) for full sample of nonmetropolitan U.S. counties

	OLS	IV	IV-w/out demographic variables	IV- state fixed effects
Intercept	-0.01	0.28*	0.10	0.43*
	(0.13)	(2.95)	(1.09)	(3.40)
State fiscal variable (differenced)				
Property tax	0.87	1.33	1.55	N
	(0.93)	(0.48)	(0.55)	
Sales tax	3.64*	8.73**	7.41***	N
	(2.62)	(2.01)	(1.66)	
Individual income tax	-3.48*	-7.14	-9.85	N
	(3.42)	(1.14)	(1.26)	
Corporate income tax	5.13	23.73**	24.04***	N
	(1.43)	(1.97)	(1.80)	
Other taxes	-4.69*	-1.54	-2.43	N
	(2.91)	(0.35)	(0.58)	
Primary and secondary education	-0.19	-2.27	-1.20	N
	(0.19)	(0.88)	(0.44)	
Hospitals & health	-0.31	-2.68	1.94	N
	(0.18)	(0.22)	(0.14)	
Highway expenditure	2.26	-0.54	0.928	N
	(1.59)	(0.14)	(0.24)	
Public safety	11.28*	4.79	-3.61	N
	(3.43)	(0.37)	(0.28)	
Environment and housing expenditure	0.13	-1.87	-5.80	N
	(0.07)	(0.35)	(1.10)	
Governmental administration	-2.52	9.52	18.47***	N
	(0.96)	(1.00)	(1.92)	
County fiscal variable (differenced)				
Property tax	0.33	-0.33	-1.50	2.07
	(1.24)	(0.17)	(0.69)	(1.12)
Sales tax	-2.08**	-4.70	-4.57	-2.16
	(2.17)	(1.09)	(0.85)	(1.18)
Primary and secondary education	-0.10	2.91*	3.47**	3.30*
	(0.45)	(2.87)	(2.41)	(3.13)
Highway expenditure	0.000	-3.47*	-2.994*	-4.18*
	(0.01)	(3.60)	(2.97)	(4.53)
Public safety	0.45	3.40	5.42***	6.35*
	(0.64)	(1.24)	(1.85)	(2.19)
Natural recreation	0.05	0.41	0.23	-0.66
	(0.14)	(0.31)	(0.16)	(0.43)
Sewerage and waste	0.22	1.33	1.18	1.97
	(0.33)	(1.17)	(0.98)	(1.63)
Demographic Variables	Y	Y	N	Y
R-squared	0.54	NA	NA	NA
No. of counties	1998	1996	1996	1996
DWH test for endogeneity	NA	113.39[0.00]	99.89 [0.00]	124.09[0.00]
Sargan overid test	NA	7.50 [0.02]	13.69 [0.00]	5.37 [0.07]
Anderson canonical correlation LM	NA	18.47[0.00]	12.56 [0.01]	24.75 [0.00]
Anderson-Rubin test	NA	104.47[0.00]	116.47 [0.00]	96.67 [0.00]

Notes: Robust *t* statistics based on Huber-White standard errors are in parentheses. *, **, and *** indicate significance at the 1%, 5%, and 10% level. NA denotes not applicable. *p*-values reported in brackets for IV tests.

Table 5. log(dep. variable 2000)-log(dep. variable 1990) for two subsamples

	Nonmetro adjacent		Nonmetro nonadjacent	
	IV-House	IV-Earn	IV-House	IV-Earn
Intercept	0.90*	0.34*	0.37	0.29
	(6.37)	(1.98)	(1.36)	(1.22)
State fiscal variables (differenced)				
Property tax	5.88	-2.83	-16.72**	-5.85
	(1.51)	(0.71)	(2.22)	(1.00)
Sales tax	7.70	1.18	-2.56	11.26
	(0.83)	(0.12)	(0.21)	(1.28)
Individual income tax	2.07	-12.67	-40.14*	-2.93
	(0.16)	(1.06)	(2.73)	(0.31)
Corporate income tax	-3.56	36.84**	70.49	57.60***
	(0.24)	(2.18)	(1.26)	(1.68)
Other taxes	-20.671*	-17.92**	-51.11**	-17.45
	(3.03)	(2.46)	(2.41)	(1.34)
Primary and secondary education	-10.99**	-3.84	4.33	-1.46
	(2.22)	(0.70)	(0.63)	(0.28)
Hospitals & health	-14.07	-26.60	-72.01*	-12.50
	(0.79)	(1.58)	(3.26)	(0.81)
Highway expenditure	12.10	-5.71	40.92*	11.10
	(1.24)	(0.67)	(3.42)	(1.37)
Public safety	33.54	38.97	51.19**	2.17
	(1.44)	(1.52)	(2.14)	(0.11)
Environment and housing	28.14*	0.57	-24.50	-8.49
	(3.00)	(0.06)	(1.15)	(0.61)
Governmental administration	-53.44**	-13.32	38.11	54.03**
	(2.57)	(0.62)	(1.18)	(2.46)
County fiscal variable (differenced)				
Property tax	-2.91	3.73	-3.46	6.61***
	(0.73)	(0.94)	(0.69)	(1.71)
Sales tax	6.74	-8.24	-13.30***	0.67
	(0.56)	-0.71	(1.71)	(0.13)
Primary and secondary education	1.18	1.95	8.07***	3.28
	(0.94)	-1.29	(1.90)	(1.56)
Highway expenditure	-3.10	0.32	-0.50	-4.80**
	(1.27)	-0.13	(0.21)	(2.52)
Public safety	4.07	3.18	11.47	-14.93
	(1.48)	-1.09	(0.90)	(1.59)
Natural recreation	-0.89	0.64	-25.29***	-9.90
	(0.60)	(0.46)	(1.81)	(1.20)
Sewerage and waste management	-1.98	3.00	0.89	1.39
	(0.75)	(1.20)	(0.19)	(0.42)
Amenity/ERS Variables	Y	Y	Y	Y
No. of counties	1039	1039	957	957
DWH test for endogeneity	96.43[0.00]	41.14 [0.00]	158.96 [0.00]	93.000 [0.00]
Sargan overid test	8.62 [0.01]	1.68 [0.43]	9.94 [0.01]	6.59 [0.04]
Anderson canonical correlation	3.94 [0.27]	5.17 [0.16]	7.64 [0.05]	8.68 [0.03]
Anderson-Rubin test	204.91[0.00]	45.02 [0.00]	257.16 [0.00]	108.44 [0.00]

Notes: Robust *t* statistics based on Huber-White standard errors are in parentheses. *, **, and *** indicate significance at the 1%, 5%, and 10% level. NA denotes not applicable. *p*-values reported in brackets for IV tests.

Table 6. log(dep. variable 2000)-log(dep. variable 1990)

	Housing		Earnings	
	IV	**IV-state fixed effects**	**IV**	**IV-state fixed effects**
Constant	0.55**	0.67*	0.24***	0.36**
	(2.02)	(4.43)	(1.70)	(2.07)
State fiscal variables (differenced)				
Property tax	-12.72	N	-2.70	N
	(1.08)		(0.65)	
Sales tax	-5.32	N	3.64	N
	(0.27)		(0.56)	
Individual income tax	-18.40	N	-4.08	N
	(0.74)		(0.50)	
Corporate income tax	4.85	N	23.89	N
	(0.12)		(1.59)	
Other taxes	-32.17***	N	-1.17	N
	(1.84)		(0.17)	
Primary and secondary education	-7.17	N	-1.64	N
	(0.72)		(0.39)	
Hospitals & health	-78.09	N	-6.21	N
	(1.41)		(0.40)	
Highway expenditure	30.64**	N	0.73	N
	(2.44)		(0.14)	
Public safety	81.92	N	16.39	N
	(1.31)		(1.00)	
Environment and housing expenditure	39.96***	N	4.57	N
	(1.65)		(0.61)	
Governmental administration	-64.77	N	-0.47	N
	(1.35)		(0.03)	
County fiscal variables (differenced)				
Property tax	-9.21	-7.91**	-2.86	0.06
	(1.21)	(2.04)	(1.07)	(0.02)
Sales tax	-18.50	-1.96	-4.70	-2.92
	(1.15)	(0.37)	(0.58)	(0.85)
Primary and secondary education	9.71***	3.47	4.59**	3.19***
	(1.76)	(1.35)	(2.16)	(1.88)
Highway expenditure	3.954	0.17	-3.76	-5.05*
	(0.94)	(0.10)	(1.53)	(2.59)
Public safety	8.660	14.83**	8.08	13.40**
	(0.64)	(2.03)	(1.38)	(2.41)
Natural recreation	-5.449	-1.18	-0.32	-0.48
	(0.98)	(0.47)	(0.15)	(0.30)
Sewerage and waste management	-0.171	-1.31	1.64	1.27
	(0.05)	(0.65)	(0.87)	(0.77)

Primary and	-9.613***	-3.62	-4.21**	-2.24
Secondary Educ-Reg	(1.72)	(1.49)	(2.13)	(1.55)
Highway expenditures-Reg	-11.520	1.15	2.51	4.73**
	(1.38)	(0.62)	(0.70)	(2.31)
Natural recreation-Reg	6.005	2.84	-1.03	0.27
	(0.88)	(0.72)	(0.32)	(0.10)
Public Safety-Reg	4.797	0.52	-0.38	0.23
	(0.35)	(0.10)	(0.06)	(0.07)
Sewerage and waste	-0.067	1.81	0.42	1.19
management-Reg	(0.02)	(1.04)	(0.21)	(0.69)
Property tax-Reg	12.24	7.05***	3.73	0.43
	(1.37)	(1.89)	(1.33)	(0.20)
Sales tax-Reg	-7.814	-16.50**	-8.50	-14.06**
	(0.54)	(2.49)	(1.35)	(2.46)
No. of counties	1996	1996	1996	1996
DWH test for endogeneity	69.93[0.03]	88.67 [0.08]	76.33 [0.02]	68.34 [0.00]
Hansen overid test	4.23 [0.12]	1.46 [0.48]	5.31 [0.07]	4.21 [0.12]
Anderson canonical correlation	17.97 [0.00]	23.94 [0.00]	20.86 [0.00]	26.72 [0.12]
Anderson-Rubin test	143.43 [0.00]	38.12 [0.00]	51.62 [0.00]	71.57 [0.00]

Notes: In parentheses are *t* statistics adjusted for spatial clustering (within BEA labor market areas) using the Cluster command in STATA 10. *, **, and *** indicate significance at the 1%, 5%, and 10% level. NA denotes not applicable. *p*-values reported in brackets for IV tests.